

On the Identity of *Sphaenorhynchus platycephalus* (Werner, 1894) (Anura: Hylidae)

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Abstract. *Sphaenorhynchus platycephalus* was briefly described on the basis of a single specimen, with only “S-Amerika” as its locality. Although it has been regarded as a distinct species, compelling evidence is lacking. A comparison of all currently described species of *Sphaenorhynchus*, including type specimens of several species, allowed us to provide morphological evidence that *S. platycephalus* and *S. orophilus* are conspecific, with *S. orophilus* being a junior synonym of *S. platycephalus*.

Keywords. Hatchet-faced treefrog; Morphology; Southeastern Brazil; Synonym; Taxonomy.

INTRODUCTION

Hylophis platycephalus was described by Werner (1894) on the basis of a single specimen, giving only “S-Amerika” as its locality and has since had a rather convoluted taxonomic history (Lynch, 1971, 1981; Villa, 1984; McDiarmid and Savage, 1984). Much of the confusion stemmed from the assumption that the holotype had been lost or destroyed, forcing researchers to associate it with known populations on the basis of interpretations of the brief original description.

Franz Werner was a professor at the *Institut für Zoologie der Universität Wien* (Institute of Zoology of the University of Vienna, Austria) from 1909–1933, when he retired. After his death in 1939, his private collection was transferred to the *Naturhistorisches Museum Wien* (Natural History Museum of Vienna); however, parts of Werner’s collection stored at the Zoological Institute of the University of Vienna, including some valuable herpetological objects of real or potential type status, were not considered to be his private property. As such, this material was not included in the inheritance and were not accessioned by the museum. One of these valuable specimens was the holotype of *Hylophis platycephalus* (IZUW 90), located in 1982 and redescribed by Harding (1991). In 1993, the Herpetological Collection at the Natural History Museum of Vienna acquired the type specimen of *H. platycephalus*, which is currently catalogued as NMW 33142.

Harding (1991) concluded that the female holotype (snout-vent length [SVL] 33.0 mm, labeled IZUW 90) of *Hylophis platycephalus* was assignable to the hylid genus *Sphaenorhynchus* Tschudi, 1838. Consequently, he considered *Hylophis* Werner, 1894 to be a junior synonym of *Sphaenorhynchus* Tschudi, 1838 and established the new combination *Sphaenorhynchus platycephalus* (Werner, 1894). Harding (1991:417) also provided evidence to distinguish *S. platycephalus* from the 10 congeneric species recognized at that time, including *S. bromelicola* Bokermann, 1966, *S. carneus* (Cope, 1868), *S. dorisae* (Goin, 1957), *S. lacteus* (Daudin, 1800), *S. palustris* Bokermann, 1966, *S. pauloalvini* Bokermann, 1973, *S. planicola* (Lutz and Lutz, 1938), *S. prasinus* Bokermann, 1973, *S. orophilus* (Lutz and Lutz, 1938), and *S. surdus* (Cochran, 1953), but noted that “*Sphaenorhynchus* is in need of a complete revision”.

Since 1991, five species of *Sphaenorhynchus* have been described (*S. botocudo* Caramaschi et al., 2009; *S. cammaeus* Roberto et al., 2017; *S. canga* Araujo-Vieira et al., 2015; *S. caramaschii* Toledo et al., 2007; and *S. mirim* Caramaschi et al., 2009) and additional material of most species has accumulated in collections. A comparison of these species and type specimens of several species allowed us to discover that *S. platycephalus* (Werner, 1894) and *S. orophilus* (Lutz and Lutz, 1938) are indistinguishable, leading us to conclude that they are conspecific.

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MATERIALS AND METHODS

Our observations are based on an extensive list of preserved specimens of *Sphaenorhynchus* (see Appendix) supplemented with descriptions by Lutz and Lutz (1938), Bokermann (1966), Kenny (1969), Bokermann (1973), Heyer et al. (1990), Harding (1991), Toledo et al. (2007), Caramaschi et al. (2009), Araujo-Vieira et al. (2015), and Roberto et al. (2017). Although it is generally possible to see vomerine, premaxillary, and maxillary teeth under high magnification in species of *Sphaenorhynchus*, when possible we corroborated their presence and number in cleared and double-stained specimens (Taylor and Van Dyke, 1985).

We follow Heyer et al. (1990) for terminology describing snout profile. Osteological data on the holotype of *Sphaenorhynchus platycephalus* (NMW 33142) were taken from radiographs produced with a Portable X-ray apparatus “PARDUS-R” (ELTECH-Med, St. Petersburg, Russia). The definition of the tympanic membrane follows Wever (1985), who defined it as an area of modified skin (where the subcutaneous layers are missing) that is much thinner than the surrounding skin, has a softer texture and different pigmentation, and, in many cases, is more or less translucent. The expansion of the transverse process of Presacral Vertebra III was measured as the ratio of the width of the tip of the transverse process (without associated cartilage) to the width of its base. Institutional abbreviations are those of Sabaj (2016).

RESULTS AND DISCUSSION

Taxonomy

The holotype of *Sphaenorhynchus platycephalus* (Fig. 1A–C) is a species of *Sphaenorhynchus* based on (1) the snout being slightly flattened and protruding in lateral view; (2) the *intermandibularis* muscle possessing an apical supplementary element (Harding, 1991:416); (3) the maxilla and quadratojugal lacking contact due to reduction of the postorbital process of maxilla; and (4) presence of a white parietal peritoneum. Character states 2–4 are possible synapomorphies of *Sphaenorhynchus* (Duellman and Wiens, 1992; Faivovich et al., 2005).

Harding (1991) provided a diagnosis and adequate redescription of the holotype of *Sphaenorhynchus platycephalus*, including some osteological and myological characters. Our observations on the holotype of *S. platycephalus* (NMW 33142) agree with Harding’s redescription with the exception of two characters. First, Harding (1991) reported the absence of dermal fringes on limbs, but we observed a discrete, slightly crenulated dermal fold on the ventrolateral margin of the left forearm of the holotype (Fig. 1C). Second, Harding (1991) reported that

vomerine, premaxillary, and maxillary teeth were “indiscernible under the dissecting microscope,” but we found those teeth to be present and visible (albeit inconspicuous) under high magnification.

Two additional characters merit clarification. First, Harding (1991) described the tympanum as being indiscernible. More specifically, the tympanic membrane is absent, but the tympanic ring and the columella are present (Harding, 1991). Second, we agree with Harding (1991) that the cloacal fold is absent, but many enlarged tubercles are present in the subcloacal region, as is a pair of larger tubercles (twice as large as others) on the ventral region immediately below the cloaca (Fig. 2A–B).

The holotype of *Sphaenorhynchus platycephalus* differs from most species of the genus in the following character states: (1) large size (33.0 mm SVL); (2) snout round in dorsal view, protruding in lateral view; (3) loreal region flat; (4) tympanic membrane absent; (5) ventrolateral margin of tarsus lacking dermal fold or tubercles; (6) elbow and heel lacking dermal appendages; (7) many subcloacal tubercles present, enlarged, not forming dermal fold; and (8) vomerine, premaxillary, and maxillary teeth present, extremely small.

The large size (33.0 mm SVL) of the adult female holotype distinguishes *Sphaenorhynchus platycephalus* from *S. bromelicola* (20.0–28.0 mm in females, $n = 7$), *S. caramaschii* (26.4–28.9 mm in females, $n = 2$; Toledo et al., 2007), *S. carneus* (19.0–22.5 mm in females, $n = 3$; Duellman, 1974), and *S. pauloalvini* (21.0–24.0 mm in females, $n = 10$). The snout being round in dorsal view and protruding in lateral view discriminates *S. platycephalus* from *S. caramaschii* and *S. surdus* (truncate, mucronate or slightly mucronate in dorsal view), *S. lacteus* (pointed in dorsal view), and *S. pauloalvini*, *S. planicola*, and *S. prasinus* (truncate in lateral view). A flat loreal region and a generally wider forearm distinguish *S. platycephalus* from *S. canga* (slender forearm and loreal region slightly convex in *S. canga*; see also Araujo-Vieira et al., 2015: fig. 4A). The absence of the tympanic membrane differentiates *S. platycephalus* from *S. lacteus* and *S. pauloalvini* (tympanic membrane present; see also Araujo-Vieira et al., 2015: fig. 3B). The absence of dermal folds or tubercles on the ventrolateral margin of the tarsus distinguishes *S. platycephalus* from *S. botocudo*, *S. bromelicola*, *S. cammaeus*, *S. caramaschii*, *S. palustris*, and *S. surdus* (row of tubercles or crenulated dermal fold on the ventrolateral surface of tarsus; Caramaschi et al., 2009; Roberto et al., 2017) and *S. dorisae*, *S. lacteus*, *S. planicola*, and *S. prasinus* (well developed and smooth dermal fold on tarsus). The lack of dermal appendages on the elbow and heel also separates *S. platycephalus* from *S. botocudo*, *S. bromelicola*, *S. cammaeus*, *S. caramaschii*, *S. palustris*, and *S. surdus* (tubercles or crenulated dermal fold on heel; Caramaschi et al., 2009; Roberto et al., 2017), *S. dorisae* (dermal fold on elbow and triangular calcar appendage present), and

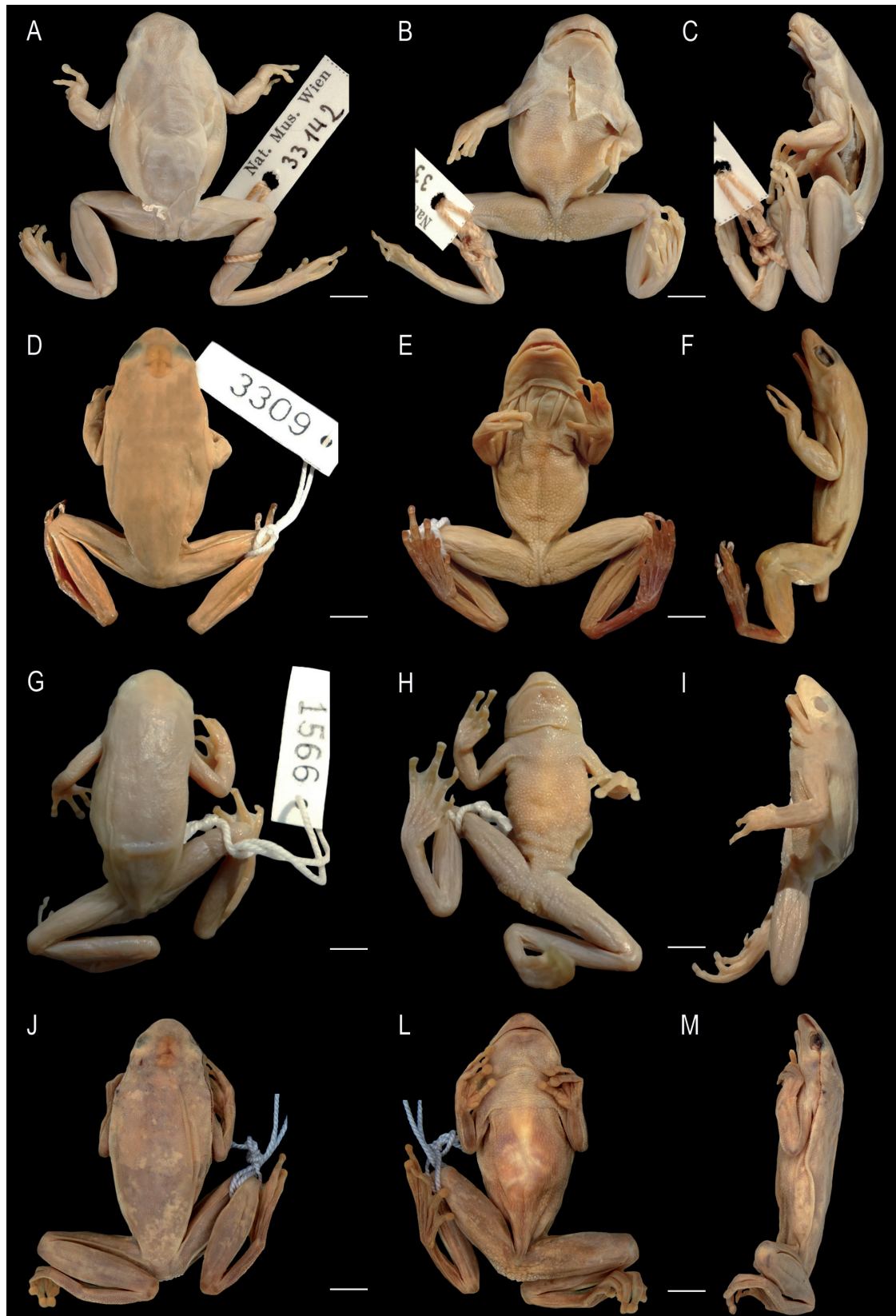


Figure 1. (A) Dorsal, (B) ventral, and (C) lateral views of the holotype of *Sphaenorhynchus platycephalus* (SVL 33.0 mm, female, NMW 33142). (D) Dorsal, (E) ventral, and (F) lateral views of the holotype of *S. orophilus* (SVL 35.0 mm, male, AL-MN 3309). (G) Dorsal, (H) ventral, and (I) lateral views of the paratype of *S. orophilus* (34.0 mm SVL, female, AL-MN 1566). (J) Dorsal, (L) ventral, and (M) lateral views of the topotype of *S. orophilus* (SVL 33.0 mm, female, AL-MN 3861). Scale bars = 5 mm.

S. mirim, *S. planicola*, and *S. prasinus* (dermal fold on elbow and round calcar appendage).

Additionally, the presence of many enlarged tubercles in the subcloacal region, not forming a dermal fold, differentiates *Sphaenorhynchus platycephalus* from *S. botocudo*, *S. bromelicola*, *S. cammaeus*, *S. canga*,

S. caramaschii, *S. palustris*, and *S. surdus* (dermal fold on the subcloacal region; Bokermann, 1966; Caramaschi et al., 2009; Araujo-Vieira et al., 2015: fig. 5A–B; Roberto et al., 2017: fig. 3A–B), *S. dorisae* (dermal flap with triangular lateral margins), and *S. lacteus*, *S. mirim*, *S. planicola*, and *S. prasinus* (dermal flap with round lateral margins).



Figure 2. Subcloacal ornamentation. (A) Posterior and (B) ventral views of the holotype of *Sphaenorhynchus platycephalus* (NMW 33142). (C) Posterior and (D) ventral views of the holotype of *S. orophilus* (AL-MN 3309). (E) Posterior and (F) ventral views of the paratype of *S. orophilus* (AL-MN 1566). (G) Posterior and (H) ventral views of the topotype of *S. orophilus* (AL-MN 3861). Scale bars = 2 mm.

Sphaenorhynchus platycephalus also differs from *S. dorisae*, *S. mirim*, and *S. planicola* by the presence of maxillary and premaxillary teeth (absent in these species); and from *S. carneus* by the presence of vomerine, maxillary, and premaxillary teeth (absent in *S. carneus*).

Nevertheless, we were unable to distinguish the holotype of *Sphaenorhynchus platycephalus* from the type series and topotypes of *S. orophilus* (Figs. 1–2). Harding (1991) tentatively differentiated *S. platycephalus* from *S. orophilus* on the basis of the absence of a cloacal fold (referred to as an “anal fold”) and the indiscernible vomerine teeth (cloacal fold present and prominent vomerine teeth in *S. orophilus*; Lutz and Lutz, 1938; Harding, 1991). However, as detailed below, these characters are insufficient to differentiate *S. platycephalus* from *S. orophilus*.

We agree with Harding (1991) that there is no cloacal fold in the holotype of *Sphaenorhynchus platycephalus*, as mentioned earlier; however, the structure of subcloacal ornamentation in both the type series and topotypes of *S. orophilus* is morphologically similar to that of *S. platycephalus*, comprising many enlarged tubercles in the subcloacal region and a pair of greatly enlarged tubercles (twice as large as the others) on the ventral region immediately below the cloaca (Fig. 2; see also Lutz and Lutz, 1938).

Vomerine teeth are present, even if polymorphically, in all species of *Sphaenorhynchus* except *S. carneus* (which lacks the dentigerous process of the vomer as well). Moreover, the disposition, number, and development of the vomerine teeth on the dentigerous process are also singular in all *Sphaenorhynchus* which present vomerine teeth, except for *S. pauloalvini*. The teeth are small, few, nonpedicellate, and irregularly disposed on the dentigerous process (Fig. 3). Also, there are many teeth with only the top of the dental germ calcified. These incomplete teeth are weakly attached to the dentigerous processes and can be easily removed when individuals are handled. These conditions are clear in the specimens of *S. orophilus* MNRJ 31731 and MZUSP 53465 (Fig. 3E). Lutz and Lutz (1938) reported the presence of vomerine teeth in the type series of *S. orophilus*; however, in both type series of *S. orophilus* and the holotype of *S. platycephalus* we observed a poorly developed dentigerous process with extremely small vomerine teeth, difficult to see even under high magnification. Therefore, counter to Harding’s (1991) findings, vomerine teeth do not differentiate *S. platycephalus* from *S. orophilus*.

Another two observations by Harding (1991) in *Sphaenorhynchus platycephalus* deserve comment: (1) transverse processes of Presacral Vertebra III not

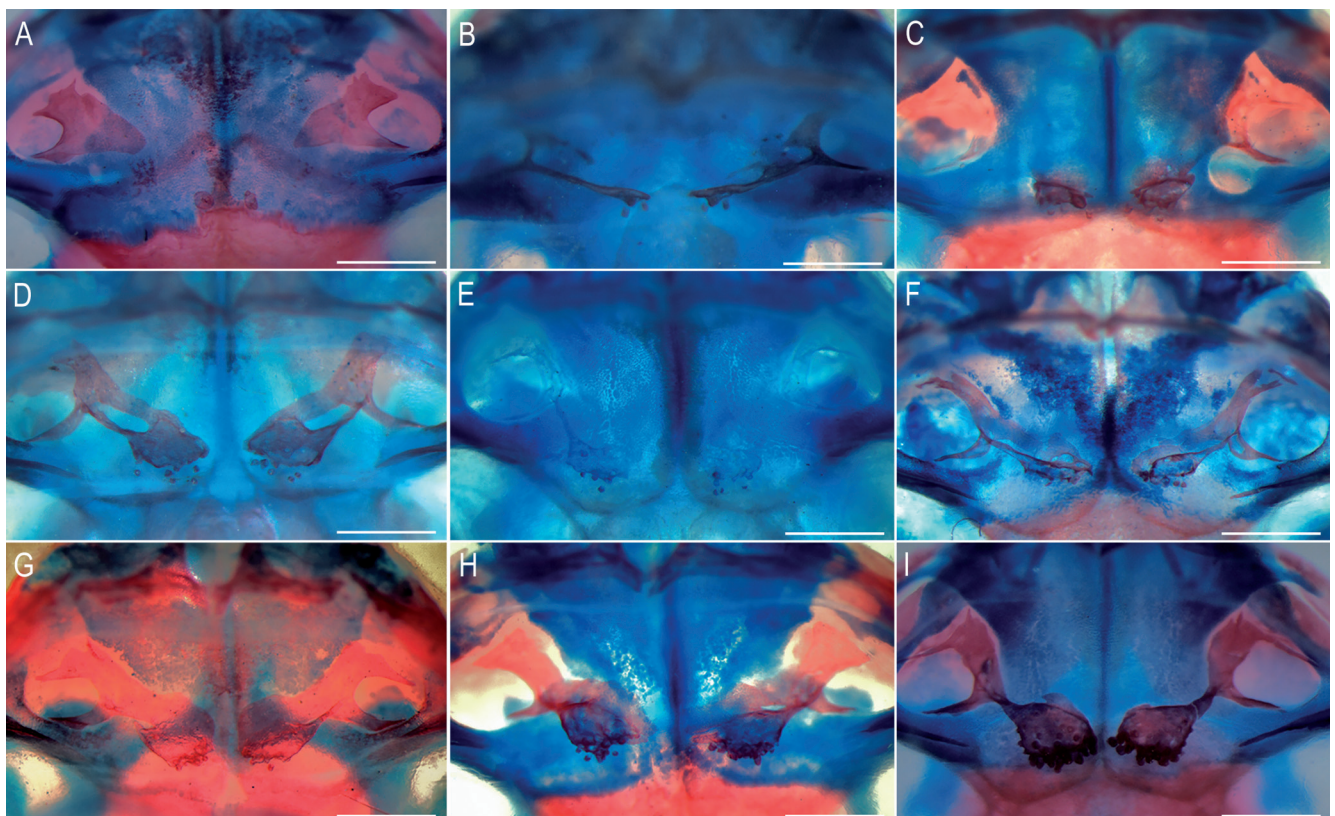


Figure 3. The vomerine teeth of (A) *Sphaenorhynchus dorisae* (ZUEC 1096), (B) *S. mirim* (MACN-He 46462), (C) *S. caramaschii* (CFBH 6933), (D) *S. botocudo* (MACN-He 46459), (E) *S. orophilus* (MNRJ 31731), (F) *S. canga* (MNRJ 56335), (G) *S. palustris* (MNRJ 43656), (H) *S. lacteus* (ZUEC 5429), and (I) *S. prasinus* (EI 59). Scale bars = 1 mm.

expanded, and (2) premaxillary and maxillary teeth indiscernible. The transverse processes of Presacral Vertebra III is expanded in all species of *Sphaenorhynchus*; however, the degree of expansion varies intra- and interspecifically, with *S. mirim* (MACN-He 46462; transverse process 0.2–0.3 times wider at the tip than at the base) and *S. palustris* (MRNJ 42656, 54982; transverse process 0.9–1.0 times wider at the tip than at the base) representing the two extremes (Fig. 4A, C). We were unable to study skeletons of the type series of *S. orophilus*, but we studied two cleared and double-stained specimens collected ca. 22 km ENE from the type locality (MNRJ 31731, MZUSP 53465). The transverse processes of Presacral Vertebra III are 0.5–0.7 times wider at the tip than at the base in *S. orophilus* (Fig. 4B) and 0.5 times wider at the tip than at the base in *S. platycephalus* (NMW 33142; Fig. 5A–B). As such, this character does not differentiate the two species.

Premaxillary and maxillary teeth are absent in *Sphaenorhynchus carneus*, *S. dorisae*, *S. mirim*, and *S. planicola* but are visible under high magnification in almost all adults of all other species of *Sphaenorhynchus* except *S. canga* (Araujo-Vieira et al., 2015). Furthermore, similar to the vomerine teeth, the maxillary and premaxillary teeth are small and few and nonpedicellate and pedicellate teeth coexist in the toothed species of *Sphaenorhynchus* except *S. pauloalvini*, and in some teeth only the top of the dental germ is calcified. Harding (1991) reported that the premaxillary and maxillary teeth are indiscernible under dissecting microscope in the holotype of *S. platycephalus*. However, although they are small and difficult to observe, premaxillary and maxillary teeth are present and exhibit the same characteristics as the those of the type series of *S. orophilus*.

A few characters of Harding's (1991) redescription do not agree with the description of *Sphaenorhynchus orophilus* by Lutz and Lutz (1938): (1) tongue cordiform (round in *S. orophilus*); (2) loreal region vertical (loreal region round in *S. orophilus*); (3) subarticular tubercles

round on feet, inner metatarsal tubercle ovoid, outer small (subarticular tubercles very indistinct, inner metatarsal tubercle minute, outer large in *S. orophilus*); and (4) coloration in preservative grayish, bleached (presence of dorsal dark pigmentation and canthal and dorsolateral lines in *S. orophilus*). However, our examination of the type series of *S. orophilus* revealed that Lutz and Lutz's (1938) description of these characters does not withstand scrutiny, as follows: (1) We agree with Lutz and Lutz (1938) that the tongue is large, thick, and round in almost all individuals of the type series of *S. orophilus*; however, paratypes AL-MN 2129 and 2699 have cordiform tongues. Similarly, Cochran (1953) also described a cordiform tongue for five male *S. orophilus* from Bonito, Serra da Bocaina, State of São Paulo, Brazil, the same locality of the paratypes of Lutz and Lutz (1938), indicating that tongue shape is either intraspecifically variable or depends on methods used to euthanize and fix specimens. (2) The loreal region of the holotype of *S. orophilus* is slightly rounded (AL-MN 3309), but it varies in the paratypes from flat (AL-MN 1566) to slightly rounded (AL-MN 2129–2130, 2698–2699). Cochran (1953) also reported a flat loreal region (described as vertical) in the specimens from Bonito. (3) The subarticular tubercles on feet of all specimens of the type series of *S. orophilus* are round and very small, and the inner metatarsal tubercle is ovoid and larger than the outer metatarsal tubercle. (4) Lutz and Lutz (1938) described the dorsal coloration in *S. orophilus* as mostly uniform green, varying from conspicuously to finely spotted black or dark brown, with golden and black or dark brown canthal and dorsolateral lines. Currently, the holotype and paratypes of *S. orophilus* have faded to become almost completely whitish yellow without any green and golden coloration (Figs. 1D–I, 2C–F), and the dark canthal and dorsolateral lines are either faintly pigmented (paratypes: AL-MN 2130, 2698–2699) or inconspicuous (i.e., a few dark spots occur in the canthal and dorsolateral regions but lines are not discernible; holotype AL-MN 3309

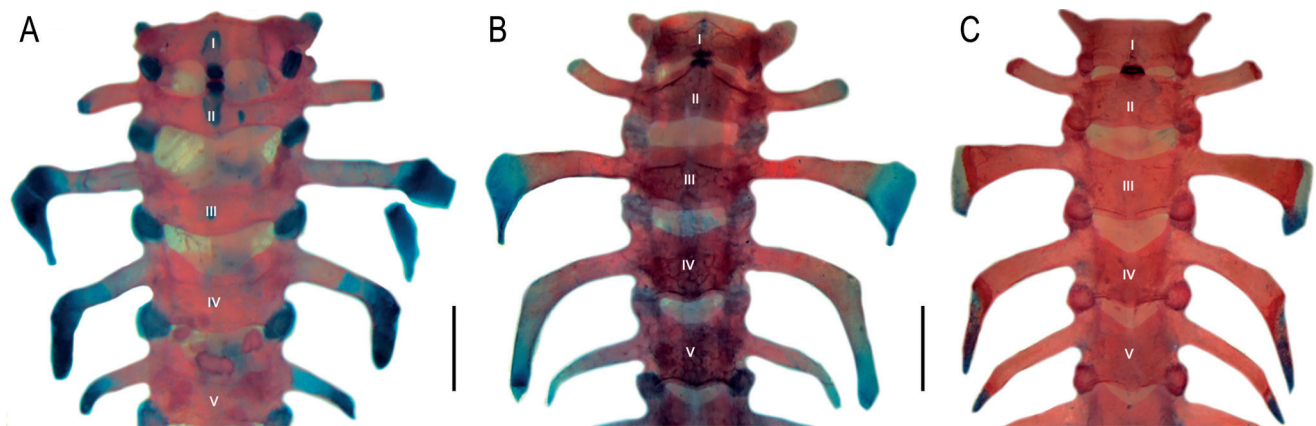


Figure 4. Anterior portion of vertebral column showing variation in the transverse processes of Presacral Vertebra III in (A) *Sphaenorhynchus mirim* (MACN-He 46462), (B) *S. orophilus* (MNRJ 31731), and (C) *S. palustris* (MNRJ 43656). Scale bars = 1 mm.

and paratypes AL-MN 1566 and 2129), suggesting that these pigments disappear when the specimens are stored in 70% ethanol. We assume that Werner did not see a recently collected specimen, but one stored in alcohol or formalin; consequently, we assume that all original coloration of the holotype of *S. platycephalus* would have already vanished when Werner (1894) made his observations and wrote “*Färbung und Zeichnung?* (*ausgebleicht*)” [“Color pattern? (bleached)”].

Also, our observations of the type series of *Sphaenorhynchus orophilus* showed that two characters deserve attention; the snout outline in dorsal view and the dermal ornamentation on forearm and tarsus. Regarding the former, Lutz and Lutz (1938) described the snout

of *S. orophilus* as round in dorsal view. However, we observed that the outline of the snout in dorsal view varies intraspecifically in *S. orophilus*: the snout in dorsal view can be truncate (e.g., AL-MN 3157–3158, MNRJ 4383), slightly truncate (e.g., paratypes: AL-MN 1566, 2129, 2698–2699, and MNRJ 4359, 4384), round (e.g., holotype: AL-MN 3309, paratype: AL-MN 2130, and MNRJ 3130, 4385, 4387, 31732–31733, 31737, ZUEC 4096), or round-mucronate (e.g., AL-MN 3962, MNRJ 31731). Cochran (1953) described the snout as truncate in dorsal view for the specimens from Bonito, and Heyer et al. (1990) described it as pointed or truncate-subovoid in dorsal view in five males from Estação Biológica de Boracéia, State of São Paulo, Brazil

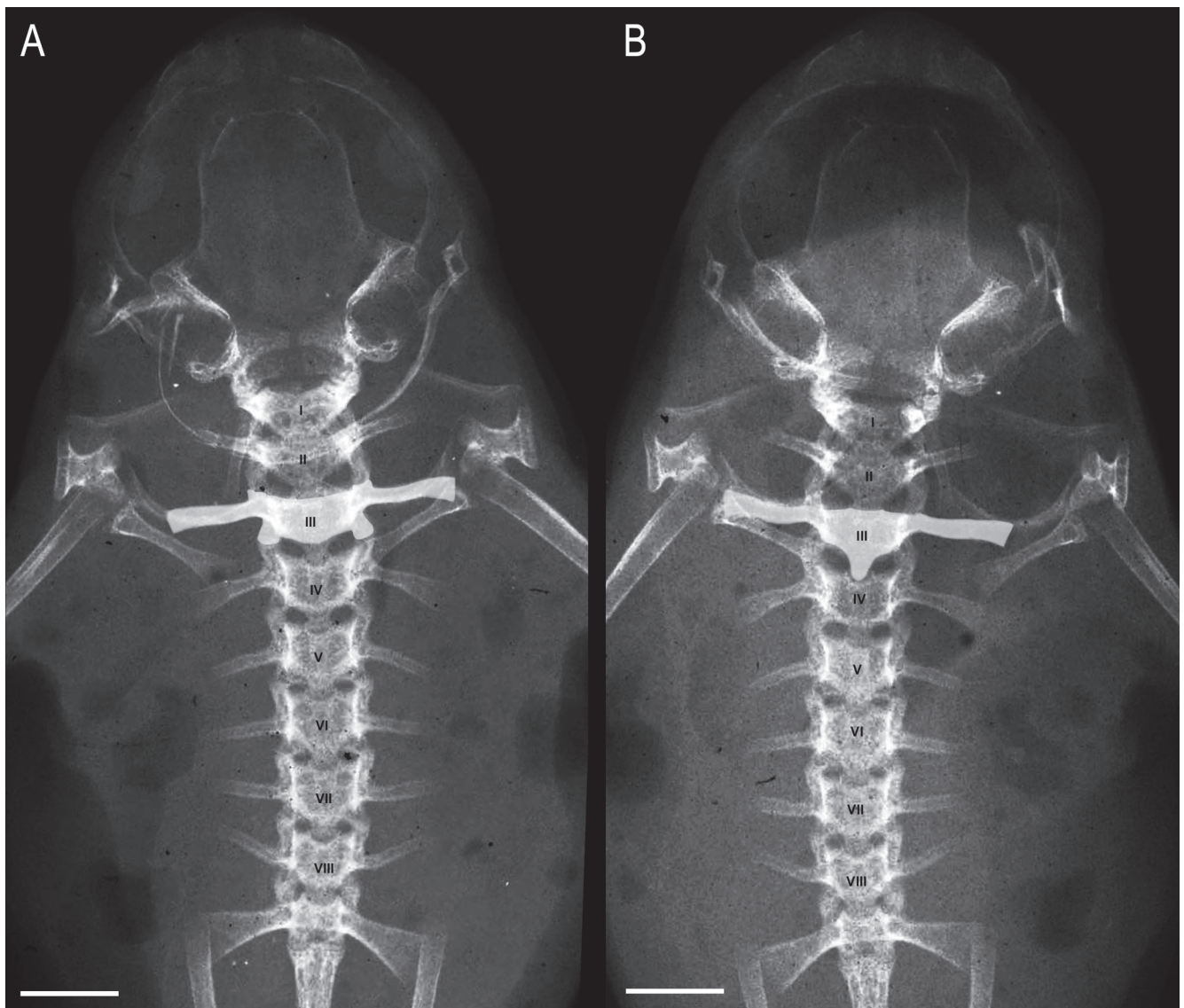


Figure 5. Radiographs of the vertebral column of *Sphaenorhynchus platycephalus* (holotype, NMW 33142) showing the distal expansion of the transverse processes of Presacral Vertebra III in (A) dorsal and (B) ventral views. Presacral Vertebra III has been digitally highlighted in both photographs. Scale bars = 1 mm.

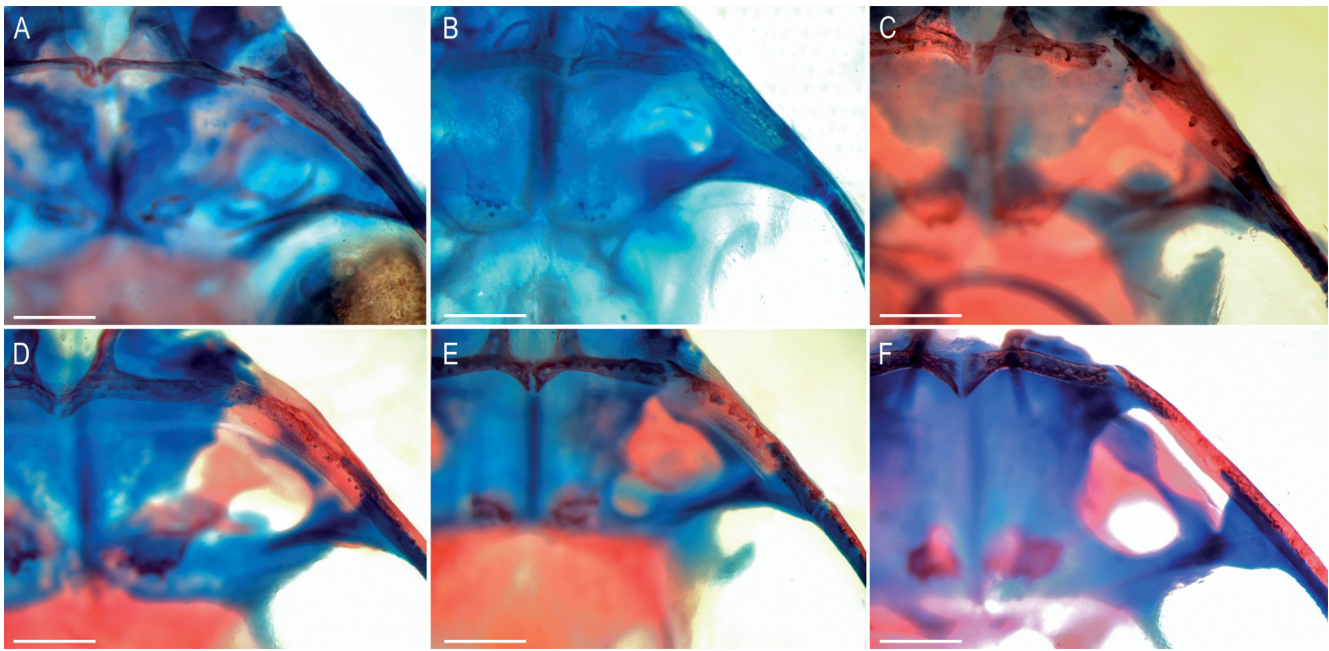


Figure 6. Premaxillary and maxillary teeth of (A) *Sphaenorhynchus canga* (MNRJ 56335), (B) *S. orophilus* (MNRJ 31731), (C) *S. palustris* (MNRJ 43656), (D) *S. lacteus* (ZUEC 5429), (E) *S. caramaschii* (CFBH 6933), and (F) *S. prasinus* (MZUESC 6861). Scale bars = 2 mm.

(ca. 570 km WNW from the type locality of *S. orophilus*). The snout of the holotype of *S. platycephalus* is round in dorsal view, thereby falling within the variation observed in *S. orophilus*.

Lutz and Lutz (1938) did not mention any dermal ornamentation on the limbs of *Sphaenorhynchus orophilus*; however, our observations showed that these dermal ornamentations are absent in the holotype AL-MN 3309 and indiscernible in paratypes AL-MN 2129–2131, 2698–2699 (fore- and hind limbs are deformed due to past dessication), but a slightly crenulated dermal fold on the ventrolateral margin of the forearms is present in the paratype AL-MN 1566. The remaining specimens of *S. orophilus* also present this dermal fold along the ventrolateral margin of the tarsus and/or forearm (e.g., forearm only in CFBH 10573; tarsus and forearm in AL-MN 3859–3862, MNRJ 4383–4385, 4359, 31732, 31734–31735, 31737, MZUSP 60228–60230, 37668, ZUEC 4096; Fig. 1J–M). Moreover, some individuals present a dermal fold on the internal margin of the tarsus from the tibio-tarsal articulation to a point adjacent to the inner metatarsal tubercle (e.g., AL-MN 3379–3380, CFBH 10573, MNRJ 4385). Cochran (1953) also reported a slightly crenulated dermal fold along the ventrolateral margin of the tarsus in the specimens from Bonito, and Heyer et al. (1990) described a poorly developed dermal fold on the ventrolateral margin of forearm and tarsus, and a dermal fold on the internal margin of the tarsus in some specimens from Estação Biológica de Boracéia. Dermal folds are absent on the tarsi of *S. platycephalus*, but we observed a discrete, slightly crenulated dermal

fold on the ventrolateral margin of the left forearm of the holotype of *S. platycephalus* similar to that observed in *S. orophilus*.

Given the absence of morphological characters that differentiate *Sphaenorhynchus platycephalus* from *S. orophilus*, we consider these taxa to be conspecific, with *S. orophilus* (Lutz and Lutz, 1938) being a junior synonym of *S. platycephalus* (Werner, 1894), with the complete synonymy as follows:

***Sphaenorhynchus platycephalus* (Werner, 1894)**

Hylopsis platycephalus Werner, 1894. Original description.

Hyla (Sphoenohyla) orophila Lutz and Lutz, 1938. **New Synonym.**

Hyla aurantiaca orophila—Cochran, 1953. First treatment as a subspecies of *Hyla aurantiaca* Daudin, 1802, a junior synonym of *Hyla lactea*, Daudin, 1800 (current name: *Sphaenorhynchus lacteus*).

Sphoenohyla orophila—Goin, 1957. Recognition of generic status of *Sphoenohyla* Lutz and Lutz, 1938.

Dryomelictes orophila—Goin, 1961. First combination with *Dryomelictes* Cope, 1865 a junior synonym of *Sphaenorhynchus* (Myers and Leviton, 1961).

Sphaenorhynchus orophilus—Bokermann, 1966. First combination with *Sphaenorhynchus*.

Hyla orophila—Kenny, 1969. Missidentified specimens of *Sphaenorhynchus lacteus* from Trinidad.

Sphaenorhynchus platycephalus—Harding, 1991. First combination with *Sphaenorhynchus*.

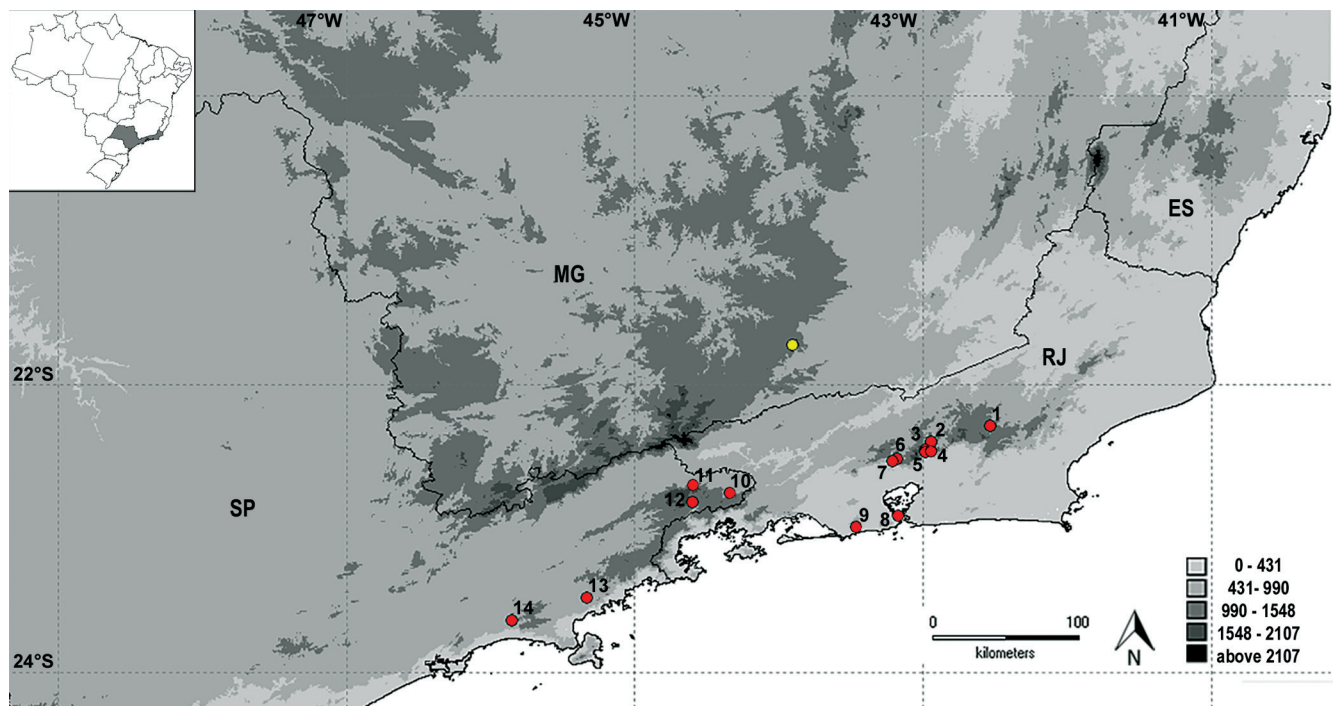


Figure 7. Localities in the Brazilian states with records of *Sphaenorhynchus platycephalus*. (1) Duas Pedras, Nova Friburgo. (2) Represa do Guinle, Teresópolis. (3) Parque Nacional Serra dos Órgãos, Teresópolis. (4) Açude da Granja Comary, Teresópolis. (5) Alto do Soberbo, Teresópolis. (6) Petrópolis. (7) Quintandinha, Petrópolis. (8) Rio de Janeiro. (9) Recreio dos Bandeirantes, Rio de Janeiro. (10) Serra da Bocaina, Bananal. (11) Rio Ponte Alta, São José do Barreiro. (12) Fazenda do Bonito, Serra da Bocaina. (13) Hotel Fazenda Santa Rita, Bairro Alto. (14) Estação Biológica de Boracéia. The yellow circle indicates the Serra da Mantiqueira's population of *Sphaenorhynchus* sp. (Parque Estadual Serra do Ibitipoca, State of Minas Gerais). ES = Espírito Santo; MG = Minas Gerais; RJ = Rio de Janeiro; and SP = São Paulo.

Type locality and geographic distribution

The only available information about the type locality is “S-Amerika” as labeled in the original glass jar and “Süd-Amerika” in Werner’s (1894) description of *Sphaenorhynchus platycephalus* (Werner, 1894; Harding, 1991). There is no additional information about the collector or possible itineraries, but on the basis of the information provided below, the type specimen of the species must have been collected somewhere in the Serra do Mar in the states of São Paulo or Rio de Janeiro, Brazil.

Sphaenorhynchus platycephalus is known from Serra do Mar in the Brazilian localities of Nova Friburgo, Petrópolis, Rio de Janeiro, and Teresópolis in the State of Rio de Janeiro and Bairro Alto, Serra da Bocaina, and Estação Biológica de Boracéia in the State of São Paulo (Lutz and Lutz, 1938; Cruz and Peixoto, 1980; Heyer et al., 1990; Fig. 7). Cruz et al. (2009) recorded a population of *Sphaenorhynchus* sp. (referred to *S. orophilus*) from Serra da Mantiqueira, State of Minas Gerais (Parque Estadual Serra do Ibitipoca) only 113 km NW from the nearest locality (Petrópolis, State of Rio de Janeiro) where *S. platycephalus* occurs. We examined one male specimen (MNRJ 26311) from this locality, and although it is superficially similar to *S. platycephalus*, we consider that its taxonomic status should be revised.

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APPENDIX: SPECIMENS EXAMINED

Sphaenorhynchus botocudo ($n = 10$): BRAZIL: **Espírito Santo**: Mucurici: Fazenda Matutina, MACN-He 46458–46459 (cleared and double stained adult female), MNRJ 50625–50626 (paratypes), MNRJ 50629–50631 (paratypes), MNRJ 50635–50636, 50639 (paratypes).

Sphaenorhynchus bromelicola ($n = 58$): BRAZIL: **Bahia**: Maracás: MZUSP 99475–99499, MZUSP 101507–101515, 101517, 101518 (cleared and double stained adult male), MZUSP 101519, MZUSP 126109, ZUEC 2789; Fazenda Santo Onofre - 10 km E Maracás, MZUSP 73754 (holotype), MZUSP 73806–73813 (paratypes), MZUSP 73831–73840 (paratypes); Fazenda Canabrava, MNRJ 4289–4290, 4292.

Sphaenorhynchus cammaeus ($n = 21$): BRAZIL: **Alagoas**: Quebrangulo: Reserva Biológica de Pedra Talhada: Lagoa do Junco, URCA-H 9293 (holotype), URCA-H 6313–6321, 9285, 9286–9292, 9294 (paratypes), MACN-He 48851–48852.

Sphaenorhynchus canga ($n = 25$): BRAZIL: **Minas Gerais**: Mariana: Chapada de Canga, UFMG-A 5715 (holotype), MNRJ 56337–56346 (paratypes), MNRJ 5716–5717 (paratypes), MNRJ 56335 (cleared and double stained adult male); 1.5 km W MG-129, UFMG-A 7192, 7194, 7205, 7207–7208 (paratypes), MZUFV 11912–11915 (paratypes), UFMG-A 7209 (cleared and double stained adult male); 5.2 km S MG-129, UFMG-A 11732, 11738–11739 (paratypes).

Sphaenorhynchus caramaschii ($n = 32$): BRAZIL: **Santa Catarina**: Treviso: CFBH 9854, 10325, MZUSP 84589, 134045, 134047; **São Paulo**: Ribeirão Branco: Fazenda São Luiz, CFBH 2285–2294, 6934–6936 (paratypes), CFBH 6933 (cleared and double stained adult female, paratype), CFBH 6937 (cleared and double stained adult male, paratype), MNRJ 19373–19377; Iporanga: Parque Estadual Turístico do Alto Ribeira-Núcleo Ouro Grosso, CFBH 6320–6323; Ribeirão Grande: CFBH 15581, 15583; Pilar do Sul: CFBH 8289.

Sphaenorhynchus carneus ($n = 36$): BRAZIL: **Acre**: Cruzeiro do Sul: Fazenda São Geraldo, ZUEC 3527; Porto Walter: ZUEC 8429, 8431; Tarauacá: Flooded places near the church, ZUEC 5555 (cleared and double stained adult male); **Amazonas**: Capim Flutuante-Rio Solimões, CFBH 4984–4985; Seringal América-Rio Purus, MZUSP 50408, 504010; Lago Pacatuba, MZUSP 53710, 53712, 53714–53715; Lago Amaná, MZUSP 58469, 58471–58472, 58474; Tabatinga: MZUSP 111240. COLÔMBIA: **Caquetá**: Alicangaros, MZUSP 99431–99432, 99436, 99440, 99446, 99448, 99453, 99456, 99458–99459, 99461–99462, 99464–99466, 99468–99469, 99471, 99472.

Sphaenorhynchus dorisae ($n = 30$): BRAZIL: **Acre**: Rio Tejo, ZUEC 11091, 11095, 11096 (cleared and double stained adult female), ZUEC 11097, 11098, 11100, 11103, 11106; Cruzeiro do Sul: TG 2835 (cleared and double stained adult male; TG: Taran Grant field number deposited in MCP), MCP 10591–10595; Porto Walter: ZUEC 8426–8427; Rodrigues Alves: Igarapé Croa-Alto do Juruá, CFBH 15721, 15723; **Amazonas**: Rio Solimões, Igarapé Belém, MZUSP 34669, 34677, 34676, 34680, 34672, 34674; Boca do Paraná do Catito, MZUSP 33190; Seringal América, Rio Purus, MZUSP 50413, 50415; Lago Janauari, MZUSP 53723, 53720; Beruri: MZUSP 50552. PERU: **Loreto**: Estirón: Rio Ampiyacu, MZUSP 32808, 32810.

Sphaenorhynchus lacteus ($n = 123$): BRAZIL: **Acre**: Cruzeiro do Sul: MCP 10570–10590, TG 2524, 2546 (cleared and double stained adult males; TG: Taran Grant field number deposited in MCP); Vila Militar, ZUEC 4689; Humaitá do Moa, ZUEC 5429 (cleared and double stained adult male), MNRJ 4284–4287; Rio Branco: Sítio Engenheiro Ramon, ZUEC 5590; Parque Zoobotânico UFAC, ZUEC 5570; Xapuri: route to Vila Boa Vista, ZUEC 5705; Mâncio Lima: Lagoa da Cobra, ZUEC 5853; Tarauacá: MZUSP 99335, 99337, 99339, 99340; **Amazonas**: Rio Solimões, Igarapé Belém, MZUSP 32814, 32817, 32821, 32835, 32837, 32841, 32845, 32846; Lago Janauari, MZUSP 53726, 53730; Manaus: URCA-H 3495–3499; Lago do Castanho-Rodovia Manaus, ZUEC 3929, 7041; Reserva Ducke, MZUSP 75715; Lago Amaná, MZUSP 58500, 58494, 58497, 58490, 58491; Puruzinho, Rio Madeira, MZUSP 51487, 51492, 51493; Boca do Acre: MZUSP 50310, 50311; São José (Jacaré): Rio Solimões, MZUSP 40365, 40367; Açaituba: Rio Purus, MZUSP 50465; Beruri: MZUSP 50581; Borba: MZUSP 51196; Tabatinga: MZUSP 11238; **Maranhão**: Anajatuba: MNRJ 18270–18275, 18277–18279; São Luiz Gonzaga do Maranhão: MNRJ 36635; **Pará**: Tapirapé Biological Reserve, MZUSP 140061, 140064, 140065, 140068; Surinam: MZUSP 84625; Tucuruí: MZUSP 76464; Belém: MZUSP 1505, 1507; Pasto de Búfalos, EMBRAPA, MNRJ 4288; Oriximiná: MZUSP 22526; **Rondônia**: Príncipe da Beira: MZUSP 99426; Porto Velho: MZUSP 99347, 99348, 99354, 99356, 99357, 99366, 99367, 99370, 99373, 99374, 99375, 99376, ZUEC 2707. COLÔMBIA: **Caquetá**: Alicangaros, MZUSP 99409, 99411, 99414, 99419, 99421, 99425; Isla Santa Sofia: Amazonas, MZUSP 39168–39170, 39172, 39174, 39175. PERU: **Loreto**: Estirón: Rio Ampiyacu, MZUSP 32801, 32802, 32804–32807.

Sphaenorhynchus mirim ($n = 11$): BRAZIL: **Espírito Santo**: Mucurici: Fazenda Matutina, MACN-He 46460–46462, MNRJ 50648–50650 (paratypes), MNRJ 50652–50653 (paratypes). MACN-He 46460, 46461, 46462 (cleared and double stained adult female).

Sphaenorhynchus palustris ($n = 21$): BRAZIL: **Bahia**: Porto Seguro: Reserva Particular de Proteção Natural (RPPN) Estação Veracel, MZUSP 127834, 127831, 127835, MNRJ 42649–42655, 42656 (cleared and double stained adult female), MNRJ 42657; **Espírito Santo**: Refugio Sooretama, MZUSP 73758 (holotype), MZUSP 73770–73772 (paratypes); Conceição da Barra: Vila de Itaúnas, MNRJ 54979–54980; Rio Preto National Forest, MNRJ 54981, 54982 (cleared and double stained adult male), MNRJ 54983.

Sphaenorhynchus pauloalvini ($n = 49$): BRAZIL: **Bahia**: Ilhéus: Centro de Pesquisas do Cacau (CEPEC), MZUSP 73751 (holotype), MZUSP 73773–73776 (paratypes), MZUSP 73791–73803 (paratypes), MZUSP 73841–73850 (paratypes); Una:

MZUFBA 7621; **Espírito Santo**: Linhares: MZUSP 101500; Estação Experimental de Linhares, MNRJ 4303–4306, 4308, 4310, 4312, 4314, 4316, 4318, 4320–4322, 4323 (cleared and double stained adult female), MNRJ 4324–4329.

Sphaenorhynchus planicola ($n = 51$): BRAZIL: **Bahia**: Trancoso: MNRJ 47811, 47812; between Barra de Caravelas and Ponta de Areia: MNRJ 4366–4368, 4370, 4372–4374, 4377, 4378; **Espírito Santo**: Fundão: CFBH 1586; Linhares: CFBH 1575, MNRJ 4331–4332; Serra: CFBH 1439, 1440; São Mateus: MNRJ 18417, 18418; Marataízes: Distrito de Gomes: Fazenda Sr. Roberto da Roseira, Marsh near Guarnano lake, MNRJ 35025–35027; Anchieta: MNRJ 25335; **Minas Gerais**: Iperó: Fazenda Ipanema, MNRJ 32824–32827; **Rio de Janeiro**: Magé: Campos dos Escoteiros: Citrolândia, MNRJ 54803–54807, 54808 (cleared and double stained adult male), MNRJ 54809–54811; Guapimirim: Vila das Pedrinhas, MNRJ 36265, 4361, 4364; São João da Barra: MNRJ 6716, 6718–6725, 6728 (cleared and double stained adult female); Maricá: MNRJ 39704; Rio de Janeiro: Barra da Tijuca, MNRJ 26880; Sernambetiba: Recreio dos Bandeirantes, MNRJ 3520, MNRJ 2084; Campos: Fazenda Barra Seca, MNRJ 41573–41583; Campos dos Goytacazes: Lagoas de Cima, Marsh near the lake, MNRJ 54353–54359; Itaguaí: Old route Rio-São Paulo - km 39, ZUEC 3808; Macaé: lake near the city access, ZUEC 8572.

Sphaenorhynchus platycephalus ($n = 27$): BRAZIL: **Rio de Janeiro**: Serra do Mar: 4 km outside Petrópolis: in a canal leading to the dam at Quitandinha, AL-MN 3309 (holotype of *S. orophilus*); Petrópolis: MZUSP 680–681; Quintandinha, MNRJ 3130, AL-MN 3156–3160, 3379–3385; 3387–3389, 3391–3409, 3859–3862, 3881–3882, 3944–3994, 4162; Teresópolis: Alto do Soberbo, MZUSP 53464, 53465 (cleared and double stained adult male); Açude da Granja Comary, MNRJ 4381–4382; Parque Nacional da Serra dos Órgãos, MNRJ 4359, 4387; Represa do Guinle, MNRJ 31731 (cleared and double stained adult male), MNRJ 31732, 31734–31735, 31737, ZUEC 4096; Nova Friburgo: Duas Pedras, AL-MN 2698, 2699 (paratypes of *S. orophilus*); Rio de Janeiro: MNRJ 126; Recreio dos Bandeirantes, MNRJ 2040; **São Paulo**: Bananal: MNRJ 4390; Estação Biológica de Boracéia, MZUSP 60228–60230, 37668; Serra da Bocaina, Fazenda do Bonito, AL-MN 1566, 2129–2131 (paratypes of *S. orophilus*), AL-MN 956–958 MNRJ 4385; Mata do Segredinho, MNRJ 4383, 4384; São José do Barreiro: Rio Ponte Alta, MNRJ 4386; Bairro Alto: Hotel Fazenda Santa Rita, CFBH 10573.

Sphaenorhynchus prasinus ($n = 57$): BRAZIL: **Alagoas**: Rio Largo: MNRJ 38680–38683; Quebrangulo: Pedra Talhada Biological Reserve, URCA-H 9295; Maceió: Área de Proteção Ambiental Catolé, MUFAL 12247; **Bahia**: Ilhéus: CEPEC, MZUSP 73749 (holotype), MZUSP 73750, 73761, 73762 (paratypes), MZUSP 73781–73787 (paratypes), MZUESC 6533, 6534, 6861 (cleared and double stained adult male), MZUESC 6862, 6863; Mata de São João: MZUFBA 7357, 4344–4346, 2962, 2969–2973; Itagibá: Fazenda Pedra Branca, MNRJ 4295–4297, 56348, 56349; Teixeira de Freitas: Fazenda Alcopadro, MNRJ 29664–29668; **Espírito Santo**: Linhares: MZUSP 75641, 75643; EI 59 (cleared and double stained adult male); EI: Eugenio Izeckson Collection deposited in UFRRJ); **Minas Gerais**: Teófilo Otoni: MZUSP 99512, 99513; Almenara: Fazenda Limoeiro, MZUFV 4152, 5938, 5939; Marliéria: Rio Doce State Park, MZUFV 2631, 2633, MNRJ 20874; Aimorés: MNRJ 56347; Nanuque: MNRJ 4517; **Pernambuco**: Recife: Dois Irmãos, MZUSP 99503.

Sphaenorhynchus sp. ($n = 1$): BRAZIL: Minas Gerais: Lima Duarte: Parque Estadual Serra do Ibitipoca: MNRJ 26311.

Sphaenorhynchus surdus ($n = 123$): BRAZIL: **Paraná**: Estrada Graciosa, Alto da Serra: Rio Taquari: MNRJ 4744–4747, 4751, 5750; Castro: Caxambú Forest Park, MHNCI 199, 221, 315–317, 319; São José dos Pinhais: Cambuí Forest Reserve, MHNCI 852; Quatro Barras: Estrada Graciosa, Corvo, MHNCI 1738–1747; Pinheiros Gralha Azul: Chácara São Francisco de Assis, MHNCI 3657, 3658; Piraquara: MCP 8324 (cleared and double stained adult male), MCP 8325; Mananciais da Serra: MHNCI 1855, 2858, 2947, 2973, 2983, 5402, 5403; Campina Grande do Sul: Cedro, MHNCI 4603–4607; Telêmaco Borba: Ribeirão Anta Brava, MHNCI 4896; Taboão da Vila Preta, MHNCI 4965; Lagoa do Gaúcho, MHNCI 4979; Adrianópolis: Rocha Church's Dike, MHNCI 5401; Tijucas do Sul, DZSJ 8656, 8788, 8789, 9049; Pirai do Sul: CFBH 8223; **Rio Grande do Sul**: Vacaria: UFRGS 2488–2491, 2507, 2788; Bom Jesus: UFRGS 2797, 2893, 2894, 2898, 2900, 2902–2910, 3075, 3076, 3082, 3100, 3102–3104, 3108, 3109, 3112, 3121, 3135, 3136, 3138, 3139, 3145; São José dos Ausentes: MCP 4618–4622; **Santa Catarina**: Rio Vermelho: MZUSP 99510; São Bento do Sul: MZUSP 99508; near São Bento do Sul, MNRJ 4402–4404, 4406, 4407, 4410, 4412 (cleared and double stained adult male), MNRJ 4415; Campo Belo do Sul: UFRGS 2787, 2895–2897, 2899, 2901, 2911, 3089, 3137, MCP 8422; Ponte Serrada: CFBH 15752; Lages: CFBH 8546; Lontras: MCP 1300–1302 (cleared and double stained adult male), MCP 1303–1305; Lébon Régis: MCP 8811; Campos Novos: MCP 9324; **São Paulo**: São Paulo: Conchas, MZUSP 99521, MNRJ 4333; Apiaí: MZUSP 101466; Guapiara: MNRJ 4335; Sorocaba: Fazenda Iperó, MNRJ 18249.